

Optically-Coupled Isolator

Optoelectronic Products

H11A1, H11A2 H11A3, H11A4

General Description

The H11A1, H11A2, H11A3 and H11A4 optical isolators are electrical and mechanical replacements for the General Electric series. Optical intercoupling provides a high degree of ac and dc isolation. A capability for continuous operation of the input diode results in a frequency response extending to dc. Connection to the base is also provided for design flexibility.

Glassolated™

Electrically Equivalent to GE Devices

Pin-for-Pin Equivalent to GE Devices

Availability of Base Pin for Flexible Design

Absolute Maximum Ratings

Maximum Temperature and Humidity

Storage Temperature -55°C to $+150^{\circ}\text{C}$

Operating Temperature -55°C to $+100^{\circ}\text{C}$

Pin Temperature (Soldering, 5 s) 260°C

Total Package Power Dissipation at $T_A = 25^{\circ}\text{C}$,

LED plus Detector 250 mW

Derate Linearly from 25°C 3.3 mW/ $^{\circ}\text{C}$

Input Diode

V_R Reverse Voltage 3.0 V

I_F Forward dc Current 60 mA

I_{pk} Peak Forward Current at 1 μs pulse width, 300 pps 3.0 A

P_D Power Dissipation at $T_A = 25^{\circ}\text{C}$ 100 mW/ $^{\circ}\text{C}$
Derate Linearly from 25°C 1.33 mW/ $^{\circ}\text{C}$

Output Transistor

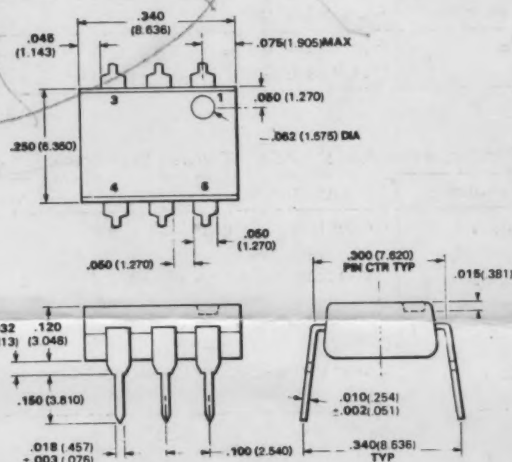
V_{CE} Collector-to-Emitter Voltage 30 V

V_{CB} Collector-to-Base Voltage 70 V

I_C Collector Current 100 mA

P_D Power Dissipation at $T_A = 25^{\circ}\text{C}$ 150 mW
Derate Linearly from 25°C 2.0 mW/ $^{\circ}\text{C}$

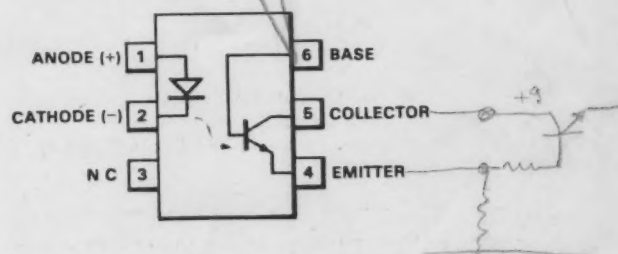
Package Outline



Notes

All dimensions in inches bold and millimeters (parentheses)
Tolerance unless specified = $\pm .015$ ($\pm .381$)

Connection Diagram DIP (Top View)



Pin

- | | | |
|---|-------------|------------------------------|
| 1 | Anode (+) | } Input Diode |
| 2 | Cathode (-) | |
| 3 | NC | |
| 4 | Emitter | } Output npn Phototransistor |
| 5 | Collector | |
| 6 | Base | |

AD
A
AS
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Typical Electrical Characteristics

H11A1, H11A2 H11A3, H11A4

Electrical Characteristics—Input Diode $T_A = 25^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_F	Forward Voltage		1.1	1.5	V	$I_F = 10\text{ mA}$
I_R	Reverse Current			10	μA	$V_R = 3.0\text{ V}$

Electrical Characteristics—Output Transistor $T_A = 25^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{CEO}	Collector-to-Emitter Voltage	30			V	$I_C = 10\text{ mA}$, $I_F = 0$
V_{CBO}	Collector-to-Base Voltage	70			V	$I_C = 100\text{ }\mu\text{A}$, $I_F = 0$
V_{ECO}	Emitter-to-Collector Voltage	7.0			V	$I_E = 100\text{ }\mu\text{A}$, $I_F = 0$
I_{CEO}	Collector-to-Emitter Leakage Current		5.0	50	nA	$V_{CE} = 10\text{ V}$, $I_F = 0$

Electrical Characteristics—Coupled $T_A = 25^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
V_{ISO}	Isolation Voltage (Note 3) H11A1, H11A3 H11A2, H11A4	2500 1500			V V V	Peak Peak Peak
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage		0.1	0.4	V	$I_C = 0.5\text{ mA}$, $I_F = 50\text{ mA}$, $V_{CE} = 10\text{ V}$, $I_F = 10\text{ mA}$
$I_C/I_F(\text{CTR})$	Collector Current Transfer Ratio (Note 1) H11A1 H11A2, H11A3 H11A4	50 20 10 10 ¹¹			% % % %	
R_{IO}	Input-to-Output Resistance		2.0		Ω	$V_{IO} = 500\text{ V}$
C_{IO}	Input-to-Output Capacitance		2.0		pF	$f = 1.0\text{ MHz}$
t_r, t_f	Collector Rise and Fall Times (Note 2)		2.0		μs	$I_C = 2.0\text{ mA}$, $V_{CE} = 10\text{ V}$, $R_L = 100\text{ }\Omega$

Notes

- Collector current transfer ratio is defined as the ratio of the collector current to the forward bias input current.
- Rise time is defined as the time for the collector current to rise from 10% to 90% of peak value. Fall time is defined as the time required for the current to decrease from 90% to 10% of peak value.
- Isolation voltage defined as minimum of 5 s continuous application.

Optically-C Darlington

Optoelectronic Product

General Description

The H11B1 and H11B2 series and mechanical replacement series. Optical interconnect and dc isolation. A operation of the input response extending to also provided for design

Glassolated™

Electrically Equivalent Pin-For-Pin Equivalent Availability of Base P

Absolute Maximum Ratings

Maximum Temperature Storage Temperature Operating Temperature Pin Temperature (Solder Total Package Power at $T_A = 25^\circ\text{C}$ LED plus Detector Derate Linearly from 2

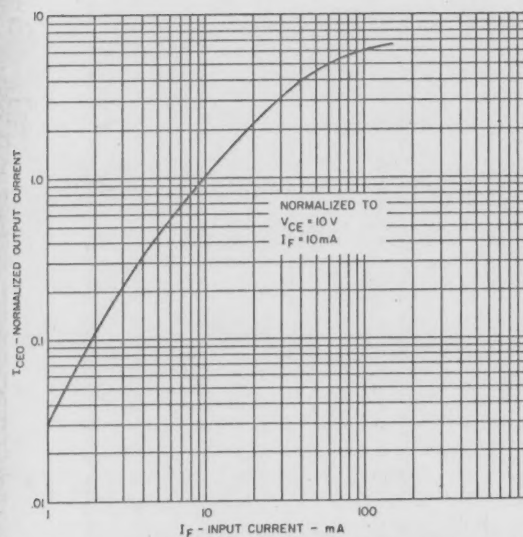
Input Diode

I_F Forward dc Current Continuous
 V_R Reverse Voltage
 I_{pk} Peak Forward Current ($1\text{ }\mu\text{s}$ pulse width)
 P_D Power Dissipation at $T_A = 25^\circ\text{C}$ Derate Linearly from

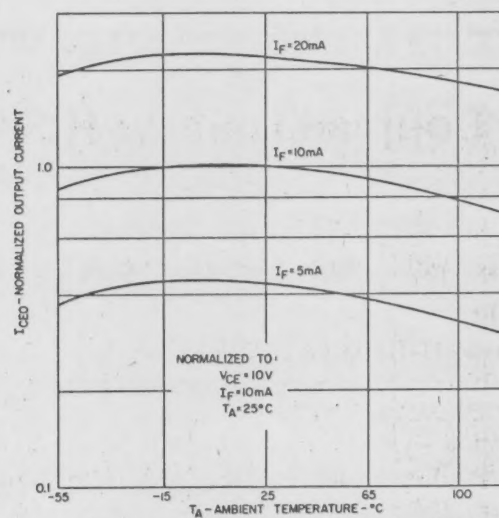
Output Transistor (Darlington)

V_{CE} Collector-to-Emitter Voltage
 V_{CB} Collector-to-Base Voltage
 V_{EC} Emitter-to-Collector Voltage
 P_D Power Dissipation at $T_A = 25^\circ\text{C}$, $I_C(\text{max}) = 100\text{ mA}$, $V_{CE} = 1.5\text{ V}$ Derate Linearly from

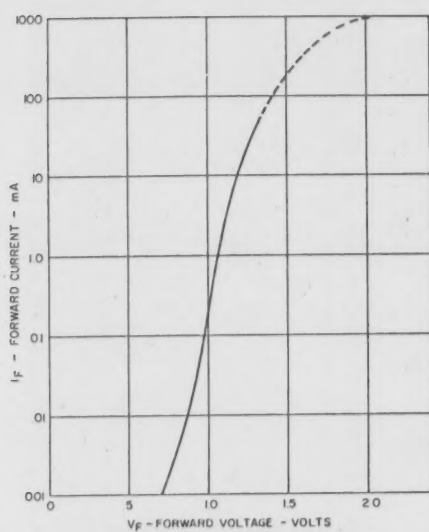
TYPICAL CHARACTERISTICS



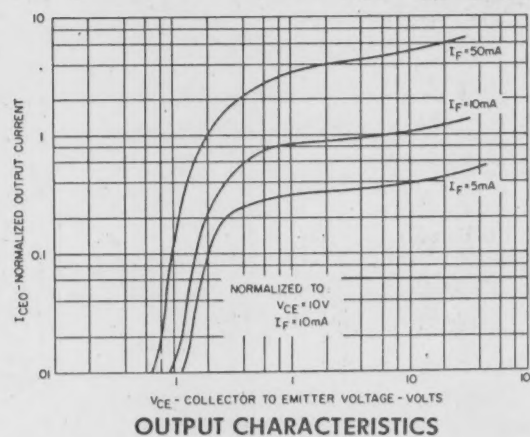
OUTPUT CURRENT VS INPUT CURRENT



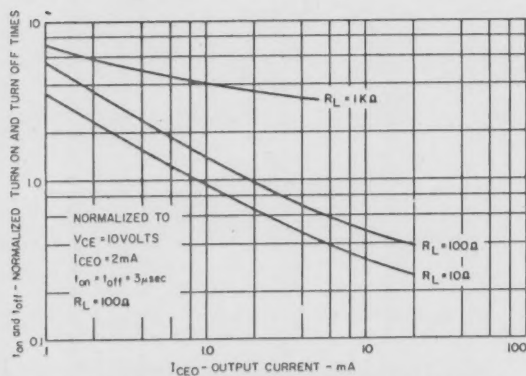
OUTPUT CURRENT VS TEMPERATURE



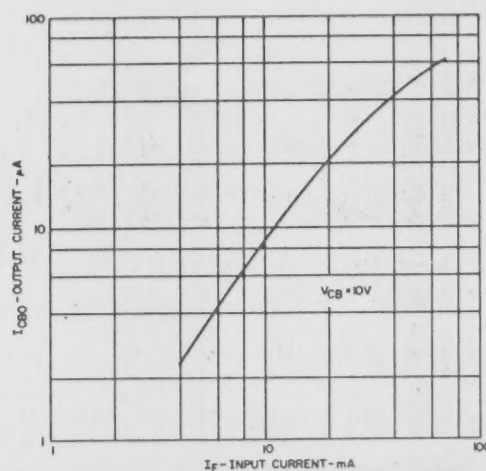
INPUT CHARACTERISTICS



OUTPUT CHARACTERISTICS



SWITCHING TIMES VS OUTPUT CURRENT

OUTPUT CURRENT (I_{CBO}) VS INPUT CURRENT